of fundal attachment, so that a forward pull on the ligament will no longer bring the fundus up in anteflexion. The point of pull in these cases is often just above the cervix so that the organ comes forward as a whole with the cervix really anterior to the fundus. The success of the Webster and Coffey operations is due to the new and higher fixation of the uterine end of the ligament. The failures appear to result from a weak insertion in the inguinal canal. The Alexander group fail so often because the uterine insertion has slid down, as did the Kelly Neel cases which we subsequently inspected.

It follows, therefore, that the surgeon should carefully consider the character of both origin and insertion of the ligament before choosing the type of his operation. He may find it necessary to advance the uterine origin as well as to strengthen the insertion in the canal, as we have done for several years.

Our experience is showing that the uterosacral operation as usually performed through the abdomen merely shortens the peritoneal fold and does not reach the strong portion of the ligament. The well developed part of the uterosacral which can be seen from above is on the uterine side. Yet when this portion is shortened, the pull is widespread and scattered out toward the mesentery since there is no fixation of the upper fascia on the sacral side. Four cases inspected at second operation showed that the procedure had been quite useless. The silk stitches were high up on the cervix and enshrouded in filmy adhesions. There was no vestige of a new ligament.

The behavior of the ovaries following various types of suspensions has been a matter of some concern. Ovaries in long standing retroflexions commonly develop symptoms. Many men forgetting this point state that ovaries are more apt to give trouble after certain types of operation. Our records show that one or both ovaries were enlarged and tender in eight of the 45 Webster suspensions, in five of the 28 Coffey's, in seven of the 27 Kelly Neel's and in four of the 20 Ferguson and atypical cases. The swelling and tenderness eventually disappeared and no case has required subsequent operation.

We cannot properly discuss the question of pregnancy following operations since only 7 women in the 120 have yet become pregnant. Their pregnacies total 11. Two women were aborted because they became pregnant immediately following operation. They have since borne children. There was one pregnancy in the Coffey group, six in the Webster and four in the Kelly Neel group, one of which miscarried. Two women in the Webster group have had two children each, since operation. There were no dystocias in the series and there has been no recurrence of the displacement.

It seems reasonable to present these conclusions:

1. Forty-two per cent. of retroversions were noted in 761 cases observed from 12 to 4 months following their delivery.

2. Seventy-six per cent. of the 322 displacements presented slight or no symptoms. Twenty-four per cent. came back because of symptoms. Eight per cent. of 439 controls with upright uteri complained of slight symptoms.

3. Twenty-two per cent. of 100 private cases presented displacements. Hard work may be an important etiologic factor for the displacements.

4. Replacement and pessaries caused anatomic correction in 80% of the cases which wore pessaries. Pessaries were not applicable in 15% of cases selected for such treatment. Replacement and pessary treatment resulted in symptomatic cure and anatomic correction in 73.5% of cases presenting symptoms.

5. Subsequent pregnancies were noted during the period of study, or following, in 15% of 439 cases who did not have displacements; in 10% of women who had treated or untreated retrodisplacements; and in 5% of 109 cases whose retroversion had not been corrected.

6. No one type of operation has been entirely successful in our hands. There were two recurrences in 89 operations which made a new round ligament fixation upon the uterine fundus (45 Webster's, 28 Coffey's, 16 atypical). There were four recurrences following 27 Kelly Neel suspensions, together with shortening the uterosacral ligaments. Since operations have not proven 100% perfect, the need of early pessary treatment is readily apparent.

NOTES ON PATHOLOGICAL REFLEXES.*

By THOMAS G. INMAN, M. D., San Francisco,
Assistant Clinical Professor of Medicine (Neurology), Stanford Medical School.

It is sometimes a very difficult matter to determine with certainty whether a disturbance of function in the nervous system depends upon actual structural change in nervous tissues or whether such disturbance of function is but one of the protean manifestations of so-called functional disease. To settle this point is the first objective of the neurological examination, no conjecturing as to the probable nature of the disorder being justified until that end is attained. Among the signs usually credited with giving positive proof that structural change has taken place in the central nervous system, the pathological reflexes have been given a position of the first importance. Properly elicited, these reflexes certainly denote, in a great majority of cases at least, abnormal action in some part of the cerebro-spinal axis, usually of the cortico-spinal bundles, the so-called pyramidal tracts. Indeed, it is so generally believed that these abnormal reflexes denote disturbance of function in these tracts that they have been considered as the most reliable of the pyramidal signs. Instances occur, however, in which some of these signs are found with satisfying completeness in conditions in which the central nervous system appears intact, but where the neuro-muscular system is at fault.

Since the observations upon which this paper is founded were concerned mainly with the Babinski,

* Read before the Forty-ninth Annual Meeting of the Medical Society of the State of California, Santa Barbara, May, 1920.

crossed adductor, Bechterew-Mendel and Rossolimo signs, these only will be considered here.

The most dependable of these pathological reflexes is the great toe sign of Babinski. It is best obtained by gentle forward stroking of the outer border of the plantar surface with a blunt instrument, but in cases in which skin sensibility is decreased, whether normally, in comatose conditions, or where there is an associated peripheral sensory disturbance, the sign is best obtained by the more vigorous use of a sharper instrument. A slow continuous dorsal excursion of the great toe with an outward and downward fanning of the smaller toes is to be considered as the ideal pathological reaction and may safely be assumed to indicate implication of the pyramidal cortical cells or their fibres leading to the anterior horn cells supplying the muscles of the toes. The lesion may be exerting its influence either upon the cerebral motor cortex or on the pyramidal fibres at any point between the cortex and the lumbar enlargement in the cord.

The crossed adductor response elicited on percussion of the patellar tendon or of the adjacent subcutaneous bony surfaces about the knee, is, properly interpreted, a pathological sign of considerable value. First described by Pierre Marie and later exploited by Lewandowsky, this sign serves to attract attention to beginning pyramidal tract disturbances. It occurs early in central affections, is frequently present in beginning arteriosclerotic changes in cord and brain, and as a hold over from past inflammatory changes in the central nervous system or the meninges. Care must be taken not to mistake mechanical agitation of the adductors for a true contraction.

Described by Von Bechterew in 1902 and independently by Kurt Mendel in 1904, the reflex obtained by percussion of the dorsum of the foot at the junction of the cuboid with the outer metatarsal bones, is now known as the Bechterew-Mendel reflex. In health there is a dorsal extension of the smaller toes. A reversal to a plantar flexion is characteristic of the pathological form of the reflex and denotes a central disturbance when the exceptions noted below are excluded.

The Rossolimo sign is obtained by sharply tapping the plantar surfaces of the terminal phalanges of the second, third or fourth toes with the percussion hammer. This is followed by a plantar flexion of the smaller toes in pathological conditions.

It may be accepted without reservation that the occurrence of one or more of the above described pathological reflexes is indicative of a disturbance in the physiological balance normally existing between flexor and extensor muscles. When first described they were believed to be due only to conditions affecting the pyramidal tracts, but later observations have shown that they may occur in peripheral disturbances, such as neuritis and muscular atrophy due either to neuritis or to disuse.

In the routine neurological examination of more than nine hundred patients entering St. Luke's Hospital under the group study plan, the presence of these reflexes called attention in a number of instances to unsuspected implication of the nervous system. Where there was no other evidence of pyramidal involvement Bechterew-Mendel and Rossolimo signs have been noted in beginning sciatic neuritis, as the first demonstrable signs in post-diphtheritic neuritis and in muscular atrophy from disuse. In one case of old healed tuberculosis of the hip, these two signs were present in the affected member, probably as a result of a compensatory disturbance in the ratio normally existing between flexors and extensors.

The presence of one or more of these abnormal reflexes is conclusive evidence that structural changes are being dealt with. This fact having been settled, the next step in the examination is taken with the object of determining by the customary well-known methods whether the lesion is central or peripheral.

RECONSTRUCTIVE SURGERY OF THE SHOULDER.*

By JOHN C. WILSON, M. D., Los Angeles.

The greatest values of military surgery are their practical applications to civil life. Whereas the average man will see many cases of a certain type during his lifetime, the opportunities for observation are increased many fold by such an international holocaust as the one we have just passed through. Functional reconstruction of the shoulder has been much discussed. Arthoplasty has had its exponents, shoulder joint resection has had its merits extolled and arthrodesis has been commended, but no definite unification of opinion has followed concerning them until the tremendous number of cases in which the shoulder joint had been damaged were available for study during this war.

If we stop to analyze the movements of the shoulder necessary in ordinary function we will see that practically every one is associated with a moderate amount of abduction. The mechanism of abduction is in itself an interesting study, for its perfection seems to depend upon the synchronous action of two forces, neither of which will operate without the other. The abductors of the shoulder are two in number, the supraspinatus and the deltoideus muscles. From the study of several cases with proven rupture of the supraspinatus tendon it would seem that abduction is initiated by this muscle, and completed to a right angle by the deltoid. The attachment of the supraspinatus tendon is uppermost on the greater tuberosity of the humerus and destruction of this muscular insertion will impair shoulder joint function. Should the resection of bone not be extensive and should the muscles of the shoulder be very well developed, a movable joint that is considered by some to be preferable, may be secured, provided the arm is kept in abduction and muscle training carefully carried out.

In a large number of cases fixation at the shoulder with the arm abducted 55 to 70 degrees and the elbow anterior to the coronal plan of the body will give the best results except when the humerus has been appreciably shortened. For

* Read before the Forty-ninth Annual Meeting of the Medical Society of the State of California, Santa Barbara, May, 1920.